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AUTHOR Miller, Leon K.  
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## ABSTRACT

Stereotypic behavior was examined in a group of five multiply handicapped children (4-10 years old) over a 2-year span. Observational data were collected at 6-month intervals in the form of 2-minute running descriptions of the child's behavior and the general setting, or condition, of the behavior (e.g., unattended, or stressed). Results revealed that the repertoire of stereotypies was quite constant over the 2-year span, especially for three of the five Ss. Individual differences did emerge, however, in terms of relative proportion of time spent in stereotypic behavior. Stereotypy remained very high for all Ss in the unattended condition. Contingency tables were constructed to examine the specific stereotypies characteristic of each child and the conditions accompanying them. Although data revealed a significant association between condition and type of stereotypy in every case, there was no apparent general principle for relating stereotypy and condition across children. (CL)

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Handicapped Children

Leon K. Miller

University of Illinois at Chicago

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Stability of Multiple Stereotypes  
in Handicapped Children

I became interested in the nature of multiple stereotypes in handicapped children because it seemed that their presence creates some problems for current theories about the role of stereotypes in a child's functioning. For example, one class of hypotheses, related to optimal arousal theory, suggests that stereotypic behaviors serve to modulate arousal in the handicapped child, who has few other cognitive or perceptual resources for doing so. This notion certainly has support in that stereotype has been shown to depend upon a variety of environmental conditions affecting arousal. Stereotypes are more frequent if the child is unattended or stressed. However, why must a child resort to several different types of stereotypes to modulate arousal? Wouldn't a principle of least effort suggest the adoption of a single effective stereotype? Perhaps different types of stereotypes serve stimulating and soothing functions - Intuitively, at least, hand waving excites, while body rocking soothes.

Alternatively, stereotypes could serve a whole set of stimulus information providing experiences. Particular sensory feedback from the stereotypic behavior is rewarding for the child and hence he maintains the behavior. Again, there is considerable empirical support for this view. The elegant studies of Rincover and others attest (e.g., Rincover, Newsom & Carr, 1979) to the rewarding properties that specific types of sensory feedback from a stereotype might have. Again, however, the occurrence of multiple stereotypes seems to present some interesting problems for specific feedback notions. For example, we have observed some children who seem to have a veritable bag of tricks in their repertoire of stereotypes. Is each

serving a specific sensory need? Why does one child regularly exhibit 2 stereotypies while another, who seems to be at the same level of functioning, exhibits 2 or 3 times as many? Are several different stereotypies serving the same sensory need? A normal child enjoys the sensory consequences of her behavior too, but the reward value usually habituates over time, and the child moves on to something else. Stereotypies, however, don't seem to habituate very readily. Might the presence of multiple stereotypies interrupt this normal process of habituation, leading to a behavior pattern which promotes some kind of spontaneous recovery?

Finally, stereotypies appear to have a counterpart in the normal development of behavior. Many infants and children body rock, watch their hands, etc. and stereotypies in the developmentally disabled may represent the elaboration of these early behaviors. However, while there appear to be some straightforward similarities between, for example, the rocking seen in babies and that in a handicapped child, the more idiosyncratic behaviors of the handicapped are much more opaque with respect to their developmental precursors. What kind of elaboration has occurred, and to what end?

As others have pointed out, (e.g., Baumeister, 1978), these varying theories about stereotypy obviously are not mutually exclusive. Certainly, it is conceivable that some stereotypies primarily modulate arousal, and others provide specific sensation. Either type may or may not have a long developmental history. In any case, it seemed that an empirical examination of the occurrence and possible functions of multiple stereotyped behaviors would provide information relevant to these questions. Some research in this direction has already been published by Baumeister (Baumeister et al., 1980). Baumeister has reported considerable intersubject variability in

children with multiple stereotypies. For some, stereotypies tend to be correlated. When one increases in frequency in a given situation, so do others. For other children, certain stereotypies appear to be reserved for certain situations. Of particular interest in the present research was whether multiple stereotypies change in their organization and function over time. Are they stable over a year, for example, or do they wax and wane in a regular fashion? Do new stereotypies appear over a 2-year time course? Are they consistently seen in certain situations? If so, which ones?

We examined stereotypies in a group of 5 multiply handicapped children over a 2-year time span. Before I share some of our observations with you, let me briefly describe our sample and data collection techniques. Our 5 children ranged in age from  $4\frac{1}{2}$  to  $10\frac{1}{4}$  years at the beginning of the study. All were blind, and while mobile, were non-verbal save for an occasional word. One child was diagnosed as having Norrie's disease: the remaining had a diagnosis of general severe mental retardation. Two of the 5 were on medication for seizure and/or activity control during the course of the study. All were participating in a state day-care educational program and had been in the program at least one year prior to the initiation of the study.

Our procedure consisted first of observing the children over the course of several months to develop a list of stereotypies for each child. One problem which occurs here is whether a given stereotypy is truly different, or whether it occurs as an element in a larger pattern. Here, our criteria were relatively straightforward. If we could discriminate it from other behaviors, and if it was observed to occur in different contexts, (that is, not only in conjunction with another behavior) we defined it as different.

For the next two years, at 6-month intervals, we collected observational data for each of the 5 children in the form of 2-minute running descriptions of the child's behavior and the general setting of the behavior; that is, whether the child was unattended, engaged in social interaction with staff, or engaged in social interaction with actual physical contact, something we called "hands on". We observed behavior at roughly the same time, in the morning each day, and collected from 6-10 sessions for each child at each 6-month interval. Reliabilities using this technique were quite reasonable. They were taken from the 6th and 18th-month series. Observers agreed about 70% of the time on whether a specific stereotypy occurred within a specific 5-second interval; with the criteria relaxed to a 2-segment "window", agreement increased to about 85%. Finally, we decided to treat each child as a separate case or experiment. This seemed appropriate because of the heterogeneity of the sample, particularly with respect to the stereotypy repertoire. To anticipate a bit, it turned out that the data also suggest considerable subject heterogeneity.

First, to questions of behavioral stability. The repertoire of stereotypies was quite constant over the two-year span, especially for 3 of the 5 children. This conclusion comes from several characteristics of the data. First, a type of stereotypy tended to occur across 6-month intervals of observation, rather than only once. Solo occurrences were rare, representing only 9% of the stereotypy types across children, and in no case did a new stereotypy arise to a position of prominence in the repertoire. Thus, the coding system we had originally designed for each child was appropriate 2 year later. In the youngest subject, one idiosyncratic behavior seen early

apparently disappeared, although with our limited sampling, we may just have failed to pick it up. Second, the most prominent of the stereotypes remained characteristic of a child over time. For 3 of the subjects, the 2 generally most frequent stereotypes accounted for over 70% of all segments containing stereotypic behavior. For the remaining 2 subjects, this figure was closer to 50%.

Did the frequency of stereotypy change over the observational period? The answer to this is a bit more complicated. In terms of the different types of stereotypes, as the foregoing discussion suggests, there was little apparent change. Multiple stereotypes were the rule, particularly for 2 of the children, across sessions. In terms of relative proportion of time spent in stereotypic behavior, some interesting individual differences emerge. Recall that we recorded the conditions under which the stereotypy occurred; unattended, social interaction, and "hands on", as well as type of stereotypy. Figure 1 shows the proportion of time in which stereotypy was observed under each of these conditions for each of the 5 children across the 4-6 month periods. As noted earlier, much research has shown that stereotypy is found with "hands on", the highest in the unattended conditions. However, there is considerable individual variation over time, particularly with respect to the unattended and social conditions. For subjects 1, 2, & 3, at the outset of the formal observations, the "social" and the "unattended" conditions were similar in that stereotypic behavior was observed in the majority of segments for each. By the end of the observation period, on the other hand, the frequency of stereotypy during social interactions more nearly resembled the "hands on" conditions for these children. This does not appear to be the case for subjects 4 & 5, for whom social interaction appeared much less effective in reducing stereotypy. Child number 4, in particular, seems to represent an example of behavioral disintegration, in

that an increase in stereotypy across situations appeared to characterize her behavior. In an informal discussion with the center director one year after these observations were made, the director mentioned, before seeing these data, that the fourth child had become "unmanageable." The fourth and fifth child here, by the way, were also the two children mentioned earlier who were least stable in terms of stereotypy repertoire. From the perspective of these data then, the answer to the question of whether stereotypy increases over time appears to be "it all depends". For all children, stereotypy remained very high in the unattended condition. For some older children in an institutional setting, this may more often be the usual situation and hence high incidence of stereotypy in these older children might be expected. For others, the increasingly high rates of stereotypy may be associated with the relative ineffectiveness of social interaction in modulating stereotypic behavior. Again, a consequence may be an increase in stereotypy over time, as is apparently the case in the fourth child. What distinguishes these two types of cases may become more apparent from a more detailed, segment by segment analysis of the relation between the initiation or cessation of social interaction and stereotypies for each child.

Finally, were certain stereotypies associated with these different conditions of interaction? For each child, we examined those stereotypies which contributed at least 10% to the total number of stereotypy segments occurring over the course of the observations. This resulted in the elimination of one child, child number 2, who exhibited a number of stereotypies occurring only between 5 & 10% of the time. For the remaining children, contingency tables were constructed, examining the specific stereotypies characteristic of each child and the conditions, unattended etc., mentioned

earlier. Chi square analyses of these contingency tables revealed a significant association between condition and type of stereotypy in every case. Examination of these associations suggested no general principle for relating stereotypy and condition across children. Rather, each child appeared to have a characteristic way of reacting to being alone, for example. For one, an intuitively arousing behavior like hand tapping or slapping would increase, while in another, solitude would bring body rocking. One problem with these analyses so far is that they give us little information about the direction of the relation between stereotypies and the different conditions of interaction. For example, did social interaction prompt certain kinds of stereotypies or did certain types of stereotypies prompt social interaction? We are currently undertaking some sequential analyses of the data to clarify these relationships.

Let me close with some general issues that arose during data collection. Each of the observers had the feeling occasionally that there were subtle variations in some of the more idiosyncratic stereotypies of the children. Whether these represented normal variation, evolving developmental elaboration, or a kind of variation on a theme was not clear. Whether these variations had disinhibiting effect was also hard to tell. Videotaped segments would have been very useful here. Second, it often seemed to us that stereotypies were orchestrated in the sense that some provided a background or baseline of rhythmic activity while others were much less regular and in a sense, punctuated the baseline activity. Also, at times, stereotypies were combined in a kind of loose choreography.

Baumeister has reported that for some children at least, certain stereotypies follow others in a predictable sequence (Baumeister et al., 1980). Examination of these conjoint and sequential occurrences may help to clarify

the issue of behavior independence mentioned earlier. In any case, these preliminary data suggest that different stereotypes serve different functions. Careful longitudinal studies may help to clarify just which kinds of stereotypes serve which functions.

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